

Abstract

A cluster router architecture and methods for performing distributed routing is presented. Implementations include off-the shelf Personal Computer (PC) hardware. The cluster router architecture includes PC-based router cluster nodes toroidally interconnected in an intra-connection network in multiple dimensions. The cluster router may further make use of a management node. Each router cluster node is provided with the same routing functionality and a node centric configuration enabling each router cluster node by itself or multiple router cluster nodes in the cluster router to provide routing responses for packets pending processing. The method divides packet processing into entry packet processing and routing response processing; and exit processing. Entry packet processing and routing response processing is performed by router cluster nodes receiving packets from communication networks in which the cluster router participates. Exit packet processing is performed by router cluster nodes transmitting packets into communication networks in which the cluster router participates. Advantages are derived from: a configurable, and scalable cluster router design providing a high routing capacity using cost effective stock PC hardware; from the toroidal topology of the intra-connection network which provides a high degree of diversity ensuring resilience to equipment failure, and from the use of the star topology of the management links which reduces management overheads in the intra-connection network.